AMSAT News Service Weekly Bulletins
Issue: ANS-104 SPECIAL
Date: 2011-04-14
Sources: amsat-ans-2011-ans-104-special-hyperkitty-756f354f13.txt

---

AMSAT NEWS SERVICE
ANS-104 ANS Special Bulletin - ARISSat-1 Not Heard During Gagarin Commemoration

SB SAT @ AMSAT $ANS-104.01
ARISSat-1 Not Heard During Gagarin Commemoration

AMSAT News Service Bulletin 104.01
>From AMSAT HQ SILVER SPRING, MD.
April 14, 2011
To All RADIO AMATEURS
BID: $ANS-104.01

The planned operation of ARISSat-1/RadioSkaf-V/KEDR on April 11 and April 12 from inside the International Space Station as part of the commemoration of the 50th anniversary of Yuri Gagarin's flight was not successful. No earth stations on the ground reported hearing transmissions on the ARISSat-1 downlink(145.950 MHz for FM analog/145.920 MHz for digital).
The planned retransmission of the satellite's FM downlink via the Kenwood TM-D700 transceiver --currently used for ARISS contacts--was also not successful as no reports were
received of signals heard on 437.550 MHz. However, a similar ARISSat-1 transmission test conducted in February was successful, with 145.950 MHz signals being successfully received by several ground stations.

At this point it isn't clear to the ARISSat-1 team what went wrong with the most recent test. Unfortunately, little information has been shared by RSC-Energia concerning plans made to configure the satellite and the interface used to connect the satellite to one of the external ARISS antennas.
The status of the satellite's Russian-provided silver zinc battery is also unknown.

ARISSat-1 is a cooperative effort of AMSAT, RSC-Energia and NASA. AMSAT designed and built the spacecraft as a prototype of a proposed series of educational satellites which can carry student-built experiments. The ARISSat-1 prototype features a student experiment designed and built by Kursk State Technical University in Russia. A backup was also provided (without solar panels). AMSAT delivered the two units to NASA's Johnson Space Center in Houston, TX in early October. NASA has led the integration of ARISSat-1 into the ISS flight program. NASA coordinated the logistics of transporting the satellite and a backup unit, including export licensing, from Houston to Moscow. The shipment occurred in early December immediately following RSC-Energia confirmation that the appropriate import documentation had been approved. NASA also conducted the three-phase Payload Safety Review that ARISSat-1 had to pass in order to be permitted to be shipped to the ISS and deployed from the Space Station. Per protocol agreements signed by AMSAT, NASA and RSC-Energia, RSC-Energia assumed full responsibility for ARISSat-1 after NASA shipped the prime and backup units. RSC-Energia's stipulated responsibilities included integration of the Kursk experiment, providing a silver zinc battery for the spacecraft, shipment of the primary flight unit to the ISS via a Progress Cargo vehicle (which took place in January 2011) and subsequent deployment during a planned Russian EVA in February 2011.

Once AMSAT shipped ARISSat-1 and the backup unit in early October, AMSAT was

no longer directly involved with management and operation of the satellite. AMSAT agreed to send a representative to Moscow (Lou McFadin, W5DID) in order to assist with testing and final checkout of the satellite once it arrived from the US. Lou was accompanied by NASA's Mark Steiner, K3MS and the requests for visas and access the RSC-Energia facilities was coordinated by NASA. Due to visa limitations (Russia does not allow changes to visas once individuals are in Russia), the window for Lou's and Mark's time in Moscow could not be changed once it became apparent that the shipment was being held by Russian customs and wouldn't be released until after the expiration of visas.
During the time that Lou and Mark were in Moscow, testing procedures were drafted and agreed to by RSC-Energia's principal investigator for ARISSat-1 (Sergey Samburov, RV3DR) as a signed protocol to assist the Russian engineers with testing and checkout without the presence of AMSAT. Lou and Mark departed Moscow on 22 DEC 10 for the US and the satellite with the backup unit were subsequently released from Russian customs and delivered to RSC-Energia on
28 DEC 10 following submission of appropriate documentation by RSC-Energia.

In addition to the missed opportunity for AMSAT and NASA to participate in the checkout in Moscow, the delayed release from Russian Customs also meant that the satellite arrived in RSC-Energia just as they were commencing a 10-day total holiday shutdown from 1-10 JAN 11. In order to make launch of the Progress 41P cargo vehicle to the ISS in January, the satellite had to be flown to the Baikonour Cosmodrome on
11 JAN 11, the day after RSC-Energia personnel returned from their holiday. Sergey Samburov, RV3DR spent a period of time during the holiday period conducting a checkout of the satellite, but it is still unclear whether the documentation provided by Lou McFadin and Mark Steiner and agreed to as a protocol was followed. For example, AMSAT and NASA have yet to receive any of the full set of closeout photographs of the satellite's exterior stipulated in the protocol.

The satellite did make the flight to Baikonour and was subsequently flown to the ISS on 28 JAN 11 on Progress cargo vehicle 41P. Once the satellite arrived at the Space Station, there was another unexpected alteration to the original plan which has been previously agreed to by AMSAT, NASA, and RSC-Energia. Russian officials now wanted confirmation that the satellite was in working order prior to EVA deployment.
Why this decision was made was never fully explained to AMSAT or NASA. Even though the satellite was never intended to be operated from inside the ISS, the RSC-Energia team made plans to operate ARISSat-1 from inside the ISS during the period
10-13 FEB 11, connecting the two-meter transmitter to one of the external antenna used for ARISS contacts with the intent of getting confirmation from ground stations that the satellite's transmissions could be received by amateur radio stations on the ground. This unexpected development raised AMSAT and NASA concerns given the potential for damage to the spacecraft inside the ISS and the possibility of misinterpretation of results. Despite these concerns, the test was successfully conducted on 10 FEB 11 for 20 hours with the Kenwood TM-D700 on the ISS used to verify normal transmission from the satellite. Ground stations, including Tony Monteiro AA2TX, did provide reception reports confirming successful operation of the satellite.

ARISSat-1 was scheduled to be deployed during Russian EVA-28, scheduled for 16 FEB 11, as one of the planned tasks on that EVA. However, AMSAT and NASA were informed on 11 FEB that RSC-Energia officials decided to remove the satellite deployment from the Russian EVA-28 schedule of activities due to complications with another task scheduled for that EVA. AMSAT and NASA were informed that the
ARISSat-1 deployment would be rescheduled and included as a task in the next Russian EVA, currently scheduled for July 2011. Around the same time, the RSC-Energia Principle Investigator mentioned the possibility of a "special event involving ARISSat-1" around the date of the 50th anniversary of the

Gagarin flight commemoration on 12 APR 11. AMSAT and NASA inferred that, by retaining the satellite onboard the ISS until the next Russian EVA in July, RSC-Energia could ensure that the satellite could be activated within the ISS specifically for the Gagarin Commemoration.

During the period from the testing on 10 FEB 11 to the planned time of activation on 11 APR 11, the satellite was placed in storage on the ISS. AMSAT and NASA were not informed of the configuration the satellite was in when it was stored, though it appears that the Lexan covers over the solar panels had been removed and replaced by 'soft covers'
that were meant to be used only in preparation for deployment.
We were not informed if the satellite was deactivated following the test, or if the battery was disconnected to prevent drainage, or if the satellite may have been inadvertently left on. Given that operation of the satellite from within the ISS was never part of the original plan and these activities took place without AMSAT and NASA involvement, the ARISSat-1 engineering team is in the dark concerning the impact of storage on the satellite. As the originally agreed-to plan was to deploy the satellite within only a few weeks of arrival on the ISS, there were no provisions made in the satellite design to prepare the satellite for long-term storage on the ISS.

Adding to the lack of information was that the primary RSC-Energia Principle Investigator for ARISSat-1 went on vacation for the entire month of March and there wasn't a designated backup to coordinate with AMSAT and NASA. Sergey, RV3DR returned from vacation on 1 APR 11, but was unavailable for the regularly scheduled weekly conference call that was scheduled to take place on 5 APR 11. This meant that AMSAT and NASA were not apprised of the details for planned operation of ARISSat-1 for the Gagarin Commemoration until late in the first week in April. AMSAT sent out a press release to the media on Friday, 8 APR 11, as well as a special ANS Bulletin containing the information that had been provided to AMSAT through information gathered by our counterparts at NASA who have access to a schedule of the planned daily activities of the ISS crew.

The documentation for the configuration and operation on 11-12 APR was developed by RSC-Energia without AMSAT or NASA input.
AMSAT and NASA were provided a draft plan only a couple of days prior to operation; that document was in Russian and we could not comment on it prior to planned activation. One new development was the last-minute decision by RSC-Energia to retransmit the ARISSat-1 two-meter FM downlink on 70 CM by configuring the Kenwood TM-700 that is currently used for ARISS contacts in cross-band repeat mode. The ARISS team was asked for a recommendation on which frequency would be appropriate to use, and the suggestion was made to use 437.550 MHz. However, procedures for configuration of the TM-D700 were not shared with AMSAT or NASA. There remains the distinct possibility that the unsuccessful result of this test was due to a misconfiguration of ARISSat-1, its interface to the ARISS external antenna, or the TM-D700.

An additional consideration is that the Cosmonauts who were available for the Gagarin Commemoration were not necessarily the same individuals involved with the 'test' in early February due to a planned crew rotation that took place in early April, where three individuals (two Russian, one American) were flown to the ISS to supplement three individuals who were still onboard.

Neither AMSAT nor NASA received any status reports directly from RSC-Energia during the timeframe of the planned operation. We also don't know what the Cosmonauts found when they operated the three activation switches on the control panel, such as whether the LEDS were lit or not. The status of the flight battery is currently unknown to AMSAT and NASA.
Hopefully, RSC-Energia will provide an update on the status of the satellite to AMSAT and NASA and a determination can be made of the health of the satellite.

As noted above, ARISSat-1 is made possible through the cooperation of RSC-Energia, NASA and AMSAT. However, the degree of information received from RSC-Energia has been very sporadic, given that ARISSat-1 is technically a Russian satellite (callsign RS01S), and, per the signed protocol agreements, RSC-Energia has assumed full responsibility for all activities associated with ARISSat -1 from pre-launch preparation in Moscow through EVA deployment from ISS. Indeed, RSC-Energia has never publicly acknowledged that AMSAT was the organization that built the satellite nor the significant NASA involvement in the project. Clearly, what our expectations are concerning 'transparency' of information does not coincide to what RSC-Energia has been willing to share to date.

We will continue our efforts to gain insight from RSC-Energia concerning what transpired regarding their planned Gagarin Commemoration event. We're anxious to know the status of the satellite as well as prospects for deployment in July. We are dependent upon the willingness of RSC-Energia to keep AMSAT and NASA informed. As we are apprised of developments, we will share that information.